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September 13, 1948

SCIENCE NEWS LETTER

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VOL. 54 NO. 20

MEDICINE

Artery Disease Attacked

Nerve-cutting operation which relieves complications in arteriosclerosis and chemical investigation of the cause of the condition are reported.

➤ ARTERIOSCLEROSIS — hardening of the arteries to you—is now under attack by both chemistry and surgery. From the chemical front may come knowledge of what makes artery walls grow hard and lose their elasticity. Following this might come a diet to prevent the condition.

From the surgical front comes a nerve-cutting operation that relieves some of the late complications of hardened arteries, such as gangrene and amputation. Progress on both fronts was reported at the meeting in Chicago of the American Society for the Study of Arteriosclerosis.

A 70% salvage rate two years after the nerve-cutting operation was obtained for 83 patients, Drs. Alexander Blain III, Kenneth N. Campbell and Bradley M. Harris of Detroit and Ann Arbor, Mich., reported.

The operation not only spared these patients amputation with consequent physical and economic disability but had a prophylactic effect in another group with early arteriosclerosis which was causing such symptoms as night cramps, cold hands and feet and intermittent claudication. All of this group got complete relief of symptoms.

The nerves which are cut are part of the sympathetic nervous system which operates independently of the brain and controls, among other things, the contracting and dilating of blood vessels. Object of the operation is to lessen the tendency toward spasm of the small blood vessels which occurs in arteriosclerosis. These blood vessels can often then carry enough blood to the legs, hands and feet to prevent symptoms of poor circulation from coldness to gangrene.

Among 24 patients who had already developed some gangrene 17 were improved by a nerve-cutting operation, Drs. Leon Gerber, William S. McCune and William Eastman of Washington, D. C., reported. In the remaining patients the operation failed and gangrene progressed so that amputation was necessary.

A disturbance in the way the body handles fatty substances, specifically fatty acids, from food is now suspected of a fundamental part in starting artery damage, with the kidneys playing an important role in this fat-handling disturbance.

Diet experiments arousing this suspicion were reported by Dr. Russell L. Holman of Louisiana State University School of Medicine.

Dogs, he found, can eat a diet with lots of fat in it without ever getting artery damage unless the kidneys are damaged. But any time after two months of such a diet kidney damage is regularly followed by artery damage, experiments showed.

The chemical injury comes before anatomical change. Dr. Holman's studies also suggest that development of artery disease may be a matter of days rather than decades and that the effects of age may be more cumulative than causative.

Fatty substances in the blood called lipfanogen and antilipfanogen are believed to play a part in the production and control of one kind of artery hardening, atherosclerosis, Drs. Henry S. Simms, Mary S. Parshley, Ruth B. Pitt and Joan B. Fulton of Columbia University College of Physicians and Surgeons told the meeting.

Lipfanogens are taken up by living cells and converted into visible fat. Antilipfanogens prevent this conversion. Blood from patients with kidney and heart diseases and diabetes, which are frequently complicated by hardening of the arteries, has somewhat less than normal lipfanogen activity and considerably less than normal antilipfanogen activity.

Dr. Kenneth B. Turner of Presbyterian Hospital, New York, cooperated with Dr. Simms and associates in these studies.

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VETERINARY MEDICINE

"X" Disease Killing Cows

➤ "X" DISEASE, so called because it is still a totally unknown quantity so far as its origin is concerned, is killing cattle in at least 32 of the states of the Union, declares Dr. H. W. Schoening, U. S. Department of Agriculture veterinarian in charge of pathological studies.

No section of the country is free from it, since the states where it has been reported are distributed all over the map. It is not at all unlikely, Dr. Schoening added, that it may be occurring in other states but has not yet been reported from them because it has not been recognized.

Symptoms are described as including loss of weight and appetite, decrease in milk yield, premature dropping of calves, fever, and a thickening and inflammation of the skin. No drug treatment thus far attempted has been successful. Of animals contracting the disease, nearly 60% die. It is a long and lingering affair, with the poor beasts dragging themselves around in an emaciated state sometimes for weeks or even months before they die.

One particularly marked symptom of X disease has become the basis of a more technical name, hyperkeratosis. This combination of Greek roots means "overgrowth of horn." It does not, however, refer to the animals' horns but to the enormous thickening of the horny outer layer of the skin, which is thrown into heavy wrinkles and folds.

How hard X disease can hit cattle owners was disclosed in a survey just concluded in five states of the Southeast, conducted by four outstanding research men. In 26 herds, totaling over 4,000 head, more than 30% of the cattle were affected, and nearly 60% of these died. Losses were estimated at more than $110,000, or over $4,200 per herd. Beef cattle were much more frequently affected than dairy types.

Suggested possible causes include infection with virus, fungus or other disease germ; a poisonous mineral in the soil or water; or a nutritional imbalance. Many samples of soils, plants, and parts of diseased animals are now being intensively examined, in order to narrow down the field, for of course until the cause of X disease is known little can be done for its treatment and not much for its prevention.

Science News Letter, November 13, 1948

GENETICS

Bacteria Found Convenient For Heredity Studies

➤ BACTERIA are being found convenient organisms for the study of mutations, or sudden hereditary changes. In the number of generations they produce in a given time, as well as in the small space they occupy and the low cost of feeding them, they put rabbits and even fruit-flies completely in the shade.

Reports of two types of bacterial mutation are presented in the PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES (Sept.). The first comes from Dr. Francis J. Ryan of Columbia University. He has found in cultures of lactic-acid-producing bacteria new strains that can get along without certain of the amino acids, or protein building-blocks, which the original ancestral species always required for living. Typical is a new strain able to get along without the common amino acid, histidine.

The other report is by Dr. E. Ruth Witkus of Fordham University. Her bacterium is a species that is normally yellow, but which has several times produced white variants which are stable, never reverting to yellow no matter how long their cultures are carried on. The curious thing is that this white mutant strain can be produced only through the cooperation of four other, and quite different, bacterial species in a mixed culture.

Science News Letter, November 13, 1948

MEDICINE

Pill Checks Gonorrhea

A single pill of penicillin a few hours after exposure will prevent this venereal disease, it was discovered in tests made on Navy personnel.

➤ GONORRHEA can now be prevented by swallowing a single pill of penicillin within a few hours after exposure, Dr. Harry Eagle of the National Institutes of Health, U. S. Public Health Service, reported.

This may herald the conquest of one of the two major venereal diseases. The famous mold remedy has already proved its power to cure cases of gonorrhea. With an easy means of prevention now available, the chain of infection could be broken and the disease may in time be practically wiped out.

The tests showing the mold remedy's preventive power were made on Navy personnel. Associated with Dr. Eagle in the studies, reported in detail in PUBLIC HEALTH REPORTS (Oct. 29), were Lieut. (jg) A. V. Gude and Lieut. (jg) G. E. Beckmann, reserve officers in the Navy Medical Corps; Dr. George Mast, commander in the Navy at the time of the studies; Capt. J. J. Sapero of the Navy Medical Corps; and J. B. Shindledecker, chief hospital corpsman, U. S. Navy.

The penicillin pills used were the ordinary penicillin G mouth tablets made by eight different firms and now available on doctor's prescription. The pills were taken an average of two hours after exposure to gonorrhea. If taken as long as 12 to 18 hours after, it might be necessary to take two pills six hours apart, but this is not definite.

No complications which might work against the general use of penicillin pills for prevention of gonorrhea have appeared so far in the tests involving several hundred men. In the first 16 weeks of the study, the pills were taken as often as five times a week, with an average of slightly over once a week.

No sign of sensitization to penicillin has developed. The germs causing gonorrhea have apparently not developed resistance to the mold chemical. And there has been no case of simultaneous syphilis being suppressed by the preventive pill, only to flare up later as has occurred in penicillin treatment of gonorrhea.

The penicillin tablets were given, one tablet per man, to from 151 to 213 men as they returned to ship from shore liberty. The tablets given these men contained 100,000 units of penicillin. In the group there were five cases of gonorrhea over a 16-week period. In three cases there was reason to doubt that the men actually received penicillin.

Men in another group of approximately the same size, varying from 137 to 217, each got a placebo tablet that looked like penicillin but contained none of the mold chemical. In this group there were during the six-month period of the test 43 cases of gonorrhea, a rate of 11.9 cases of gonorrhea per 1,000 liberties with a sickness rate of 508 cases per 1,000 men per year.

In the group that got the 100,000 unit penicillin tablet there were 1.8 cases of gonorrhea per 1,000 liberties and an average sickness rate of 105 per 1,000 men per year.

When the penicillin-treated group had their dose stepped up to 250,000 units in a single tablet, during an eight-week period only one case developed among from 87 to 141 men taking 569 liberties. In that case the man said he had not taken the penicillin pill.

The 250,000 unit penicillin pills were then made available to the entire station on a voluntary basis. During an eight-week period, involving 225 men and 1,943 liberties, seven cases of gonorrhea developed. Of these, six were in men who did not request the penicillin pills on returning from liberty. The seventh developed a week after the man received the pill, but during this week the man had been A. W. O. L. for five days with repeated exposures to gonorrhea.

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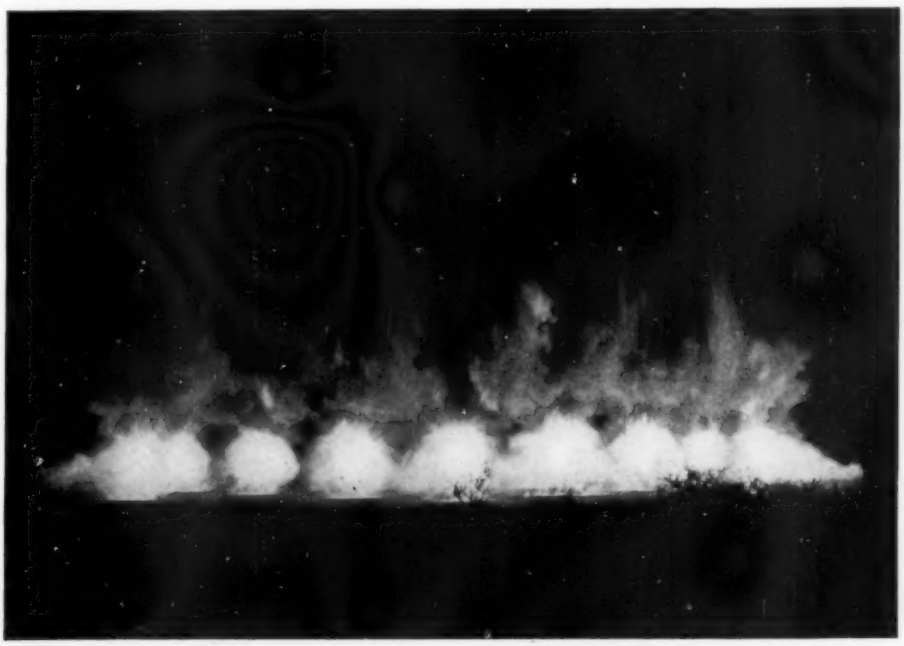
ENGINEERING

Improved Seismic Method Of Locating Oil Revealed

➤ AN IMPROVED method of locating probable underground petroleum deposits by the so-called seismic method was revealed by the Institute of Inventive Research, San Antonio, Texas. It is the work of Dr. Thomas C. Poulter, and utilizes "shaped charges" of explosive compositions which are set off above the ground, thus eliminating the cost of drilling shot holes.

Shaped charges go back to what physicists know as the "Munroe effect" which was announced to the world in 1888 by Prof. Charles E. Munroe. He found that if a hollow is made in an explosive cartridge on the side toward the object to be blasted, the effect is greatly increased. The hole can be conical or hemispherical in shape. The principle was well applied during the war in the bazooka rocket, which was far more effective in piercing armor plate than bullets.

In the seismic method of locating probable oil deposits under the earth, a seismograph similar to that used in observatories to record earthquake tremors is employed. But the tremors are man-made, and are rather minor. An explosive is detonated in a drill hole, the depth of which varies in



SEISMIC OIL EXPLORATION—Picture shows night explosion of 13-charge detonation covering 120-foot area. This new, above-ground explosion method is expected to be cheaper than conventional methods and to speed up search for oil.

different locations. Shock waves travelling downward deep into the earth are reflected back by certain structures if encountered. Experts, from a study of the recordings made by these reflected shock waves, are able to determine underground layers favorable to petroleum deposits.

Dr. Poulter's new method will provide economy in eliminating the need of boring holes, and it can be used in regions where boring would be exceedingly difficult, as in isolated mountainous country or in a search for oil under the sea. Dr. Poulter, who is associate director of Stanford Research Institute of Palo Alto, Calif., has tested his method against conventional procedures in various locations.

In his procedure, the charges in the explosive pattern are set on stakes relatively close to the ground and spread in a hexagonal design. Depending upon the type of records sought, comparatively light charges are placed from five to 85 feet apart and detonated simultaneously. The method may be used to produce an essentially flat wave front of low amplitude over a relatively large area.

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MEDICINE

New Way To Treat TB

➤ A WAY to improve streptomycin treatment for tuberculosis and bring its benefits to patients suffering from the very common, late type of the disease, fibrocaseous tuberculosis, has been discovered by Drs. Edgar Woody, Jr., and Roy C. Avery of Vanderbilt University School of Medicine, Nashville, Tenn.

The method is to give the famous mold remedy with another medicine, potassium iodide. The streptomycin would be given by hypodermic injection and the iodide in drops to be swallowed in water.

Success with this treatment in tuberculous guinea pigs is reported by the Vanderbilt scientists in the journal, SCIENCE (Nov. 5). The guinea pigs were all infected with the same dose of TB germs. It was a big enough dose to kill all the untreated animals. Of those treated with streptomycin alone, 46.1% died. Of those treated with streptomycin plus potassium iodide, only 14.3% died.

The scientists hope they can get a grant of funds in order to study the treatment in human patients. They feel pretty sure it will be successful.

Streptomycin treatment alone has not been too successful in this type of tuberculosis. The iodide acts to release the TB germs from the fibrocaseous tissue in which they become entombed in the lungs of patients in late stages of the disease. Once the germs are released, the streptomycin gets a chance to act on them.

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PSYCHOLOGY

Drawings Reveal Emotions In Children and Adults

➤ EMOTIONS in both children and older persons may be studied through analysis of their drawings, Dr. L. van der Horst, of Amsterdam, Holland, reported.

The very young child lives in intimate contact with his surrounding world, Dr. van der Horst told the Mooseheart Symposium on Feelings and Emotions in Mooseheart, Ill. It is as much a part of him as is the adult's body. The young child and his picture are one.

Between the age of four and seven, children draw because they need a motor outlet. It is not until somewhere between the seventh and tenth years that it is possible for the child to think of the object as apart from the self. It is then that the creative urge is revealed and the child begins to have a desire for drawings as symbols to portray his experience.

After the tenth year, the drawings are extended to include human relationships and the child's own imaginings begin to show up. It is even later that the child begins to demand of his drawing that it be an objective reproduction of his intention.

By studying a child's drawings and their linkage to his imaginative life and emotions, we find a new approach to the study of the child mind, Dr. van der Horst concluded.

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GENETICS

X-Rays Can Harm Genes

If too large a dose of X-rays during routine treatment of a patient reach the reproductive glands, his remote descendants may be born defective.

➤ YOU DO NOT have to wait for an atom-bomb to receive a dose of rays that will cause your remote descendants to be crippled or otherwise defective. It can happen to you in the course of X-ray treatments for certain kinds of cancer, or even in a routine X-ray examination of your abdomen, if enough of the rays reach your reproductive glands.

This warning was given by Prof. H. J. Muller of the University of Indiana, in a lecture before the University of Chicago chapter of the Society of Sigma Xi in Chicago. Prof. Muller received the 1946 award of the Nobel Prize in medicine and physiology for demonstrating the possibility of producing hereditary bodily changes through the use of X-rays.

X-rays and other penetrating radiations used in clinics and laboratories can do the same kind of things to descendants of human beings that they do to the offspring of fruitflies, because the cell mechanisms that determine hereditary characters are essentially similar in them, and in all other higher organisms.

Most mutations are harmful, whether they occur spontaneously or through impact of X-rays or other disturbing influences, Prof. Muller pointed out. In perhaps a majority of cases they are of the type known as lethal, and simply prevent the affected individual from coming into existence at all. But if birth does take place, the unfortunate "mutant" is apt to be deformed, or blind, or abnormal in some other way.

These misfortunes of X-rayed fathers (and mothers) are more likely to be visited on descendants in third and fourth and subsequent generations than on their immediate offspring, Prof. Muller pointed out. Their coming to light depends on the meeting in reproduction of two deficient genes, for if one normal gene is present it will possess the controlling influence, and the deficient gene will simply be carried forward into another generation, to lie in wait for its "opposite number."

X-rays and other rays produce hereditary changes in two ways, Prof. Muller told his audience. The first is the result of an impact on a single gene, changing it from normal to deficient. The second method of change is more easily demonstrated, for it consists in the breaking apart of a whole chromosome by a ray. The broken ends tend to re-unite, but if the patch takes place in the wrong way results in succeeding generations are apt to be unfortunate.

However, X-ray doses are capable of harming the individual who receives them, even if the usual warning signs such as reddened skin and loss of hair are absent, Prof. Muller warned in conclusion. Recent statistical studies, he declared, have demonstrated that the life-span of persons given courses of X-ray treatments is significantly lowered. For this reason, he suggested strongly the use of alternative treatments, where such exist.

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MEDICINE

Vitamin Lack May Be Cause Of Heart Troubles, Cancer

➤ LACK of some still undiscovered vitamin or other chemical may be the cause of artery hardening, high blood pressure, heart disease and cancer. This possibility was suggested by Dr. Tinsley R. Harrison of Southwestern Medical College, Dallas, at the meeting of the Association of Life Insurance Medical Directors of America in New York.

In the world search for not only longer but more useful and vigorous life, great strides have been made in conquering two degenerative diseases, diabetes and pernicious anemia, Dr. Harrison pointed out.

Each of these diseases is due to lack of a chemical needed by the body, insulin in the case of diabetes and a substance in liver in the case of pernicious anemia. Other degenerative diseases might, he suggested, also be due to "deficiencies of substances or processes as yet unknown."

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ELECTRONICS

Electronic Pencil Enables Composers To Hear Score

➤ COMPOSERS may now play the music they have written on a simple electrical machine by writing out the score with an electronic pencil.

The new composer's music box was described in Cleveland to the Acoustical Society of America by Prof. Robert B. Watson of the University of Texas physics department and defense research laboratory.

"Some composers are able to hear the music mentally at the time of composition," Prof. Watson explained, "but others desire to hear certain musical passages while composing. A composer may now use a compact electro-acoustic device to produce various tones with comparative ease and little distraction from writing his musical score."

The music box is operated similarly to writing with paper and pencil. The tone is started by placing the electronic pencil on

COMPOSER'S MUSIC BOX—Musical scores can now be written with an electronic pencil which permits the composer to hear his music while he is composing it. Pitch and volume are varied by moving the pencil.

the plate of the instrument and stopped by lifting it.

Pitch is increased by moving the pencil upward. Loudness is increased by movement to the right. Tonal qualities of the sound can be obtained by varying the circuits in the machine. Skill of the player enters in variations of timing, pitch and volume.

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MEDICINE

Polio in Drinking Water

➤ THE GERMS, or viruses, of infantile paralysis and several other diseases can get into drinking water through back-siphonage in the plumbing system. Once in the water, they can survive for from one to seven days even when the water is chlorinated to the extent most city drinking water is.

Experiments showing this are reported by Dr. Joseph Zichis of the Markham Laboratories in Chicago and Dr. E. A. Piszczek of Cook County Health Department in the journal, SCIENCE (Nov. 5). This seems to add evidence to the suspicions of many scientists that one way infantile paralysis spreads is through contaminated drinking water.

The viruses of St. Louis encephalitis, of western equine encephalitis (so-called horse sleeping sickness) and of lymphocytic choriomeningitis were the ones tested besides the infantile paralysis virus.

Infantile paralysis, St. Louis and Japanese B encephalitis and infectious hepatitis (jaundice) viruses all can produce the diseases when given by mouth, and the infantile paralysis virus is known to leave the body through the intestinal wastes.

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ENGINEERING

Full Use of Highways

➤ THE PUBLIC is not getting the full use of the highways to which it is entitled, the American Petroleum Institute was told in Chicago by John S. Worley of the University of Michigan. Public interest must come first in the study of any highway problems which may arise.

We are faced with a number of these problems, he said, among them taxation, trade barriers, an adequate highway plant, uniform traffic code, safety, a fuller use of our highway plant, and long-range highway planning. Taxation he characterized as probably our most confusing activity, administered with the least intelligence of all our highway transport activities.

Fuller use of the highways and streets, in which more than $33,000,000,000 has been invested, includes their use to full capacity. The capacity of a highway is found in the elements of space for and strength for carrying the loads.

The reasonable capacity of a modern rural road, in terms of passenger cars, is about 450 cars per lane per hour when the average speed is 42 miles an hour. Trucks and trailers reduce this amount. Congestion begins where the number of cars increase or the average speed is less. But few rural roads are used to the saturation point.

In urban areas, it is the street intersections rather than lack of lane space which governs the number of vehicles moving along a street. A great deal of the congestion we think we encounter in cities is psychological. If measured in time lost, it would be found to be only a few minutes per 24 hours.

Heavier loads would make possible fewer trucks on the highway, as well as a lower charge for service, all of which is in the public interest, he declared. Legal loads permitted in adjoining states upon the same road built under Federal specifications show how the public does not get the full use of its highways. On U. S. Highway 23, as an example, the allowable gross load in Michigan is 120,000 pounds; in Ohio, 77,500 pounds; and in Kentucky, only 50,000 pounds.

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ARCHAEOLOGY

Prehistoric Eskimo Houses Had Beams of Whale Ribs

➤ PREHISTORIC Eskimo houses in which the long ribs and jawbones of whales served for timbers were excavated on the coast of Frobisher Bay in Baffin Island during the past summer by Dr. Henry B. Collins, Jr., Smithsonian Institution archaeologist. They were built on the same general plan as the "dugouts" used as dwellings by both Indians and early white settlers in the West, except that in the latter wooden poles supported the roof over the pit that constituted the main part of the house.

Most of the weapon points, tools and household utensils found in the ancient village belonged to the very old but still undated Eskimo type known as the Thule culture. They were made of stone, ivory, bone and antlers. Such artifacts have been found over a wide stretch of territory, from Greenland to Alaska. It is believed that the Thule culture started in Alaska and spread eastward.

Along with these Thule artifacts, which are large and rough, were many small, very delicately carved implements of the type known as the Dorset culture. Users of these were an earlier people, who also apparently spread eastward from Alaska.

Although it is usually supposed that the Thule culture dates from about 800 years ago, the only definite date that can be assigned in connection with the village which Dr. Collins excavated is one earlier than the end of the sixteenth century, when the English explorer Frobisher penetrated into the waters north of Canada seeking the fabled Northwest Passage. The Eskimos whom he met were already using iron tools—and no trace of iron was found in the ancient village on the shore of the bay that bears his name.

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BIOCHEMISTRY

Broken-Down Cells Can Still Synthesize Protein

➤ A NEW WAY of studying protein synthesis and new information about this all-important tissue-forming mechanism have been reported at the University of California.

Living cells apparently do not have to be intact in order for protein synthesis to be carried on, a team of researchers headed by Dr. David M. Greenberg report.

The scientists broke down the walls of living liver cells, and placed the nuclear material in a nutrient solution. Then they added radioactive glycine, labeled with radioactive carbon 14, which permits the carbon atom to be traced through any chemical reaction.

Radiocarbon atoms showed up in the protein material, indicating apparent incorporation of the glycine into protein. It was also found that a considerable portion of the glycine had been transformed into another kind of amino acid, serine.

Dr. Greenberg said there was evidence that protein synthesis and the transformation of one amino acid into another is accomplished by enzymes, chemical agents which catalyze biochemical reactions. He added that there appears to be a special enzyme for protein synthesis, and another one for transforming one amino acid into another.

The scientists expressed hope that further studies along this line may make it possible to isolate these enzymes. Dr. Greenberg said that while protein synthesis in the laboratory is a long way off, the new information will be of help.

Protein synthesis was observed earlier in the Berkeley laboratories, using radioactive sulfur and radioactive glycine with intact cells in the form of liver slices. However, the new technique expands the scope of experiments that can be performed.

Dr. Greenberg's associates in the research were Drs. Theodore Winnick, Felix Friedberg, and Martin P. Schulman, of the department of biochemistry.

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PHYSICS

Mothballs Have New Use

Crystals of the chemical give promise of a new method of detecting radioactivity. In some respects it is superior to the Geiger counter.

➤ MOTHBALLS promise to become important in giving warnings against dangerous radioactivity from exploding atoms or the detection of new facts about the composition of matter. They are competing with the famous Geiger counter, familiar detecting device of radioactivity.

The stuff of ordinary mothballs is finding a use in the detection and counting of speeding subatomic particles and gamma rays. Naphthalene (mothballs), anthracene, and alkali halides such as sodium iodide have all been successfully tested as detectors, according to recent investigations reported to the PHYSICAL REVIEW (July 1, Aug. 15), journal of the American Physical Society.

Counters using crystals of these compounds are called scintillation counters, and have characteristics superior in some respects to the familiar Geiger counter.

The scintillation counter is constructed by placing the sensitive crystals in front of the light-sensitive aperture of a conventional photo-multiplier electron tube. A high energy particle or gamma ray in passing through one of the crystals produces a tiny flash or scintillation of light. These flashes are seen by the photomultiplier tube and are converted to tiny electrical impulses. These tiny impulses are then in turn amplified nearly a million times in the photo-multiplier tube to give a usable output voltage pulse.

The advantage of the new scintillation counter over the more familiar Geiger counter lies in its very high speed of response. The slower Geiger counter has a dead time for a few thousandths of a second after each count before it recovers its sensitivity and is able to detect another particle. The scintillation counter, on the other hand, is so speedy in response that it can make several counts within a millionth of a second.

With the new counter such rapidly occurring events as the decay of a meson or of the energy transitions of a nucleus can be accurately observed and timed in order to supply important new information about the energy spectra of these processes.

Some of the latest reported researches on the new scintillation counters have been done at the University of California Radiation Laboratory, Oak Ridge National Laboratory, and Princeton University.

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STREET LIGHTS GET "BRAIN"—The electronic "brain" which turns street lights on and off automatically at dusk or dawn is in the center transparent tube being demonstrated by a GE engineer.

ENGINEERING

Individual Street Lamps Lighted Automatically

➤ INDIVIDUAL street lights may now be turned on and off automatically as dusk and dawn approach by means of a small photoelectric cell unit which is designed so that it may be plugged into the top of a properly adapted lamp. The device was revealed by General Electric.

The use of photoelectric cells to turn lights on and off is not new and has been applied for some time with classroom lights in schools and also in other types of buildings. Another application is in the revolving beacon lights placed on aviation routes. This new application, with a specially designed equipment, should result in economy because the individual lamps are in operation only when it is dark enough to need them.

A gas-filled phototube, an electronic device sensitive to red light, is used as the brain of this automatic lamplighter. The type sensitive to red light was selected because the light of the setting sun in early evening is nearer the red end of the spectrum.

A little window in the housing over the photocell unit faces north and so is shielded from the direct rays of the sun. The phototube will operate when outdoor light intensity reaches a point at twilight when objects some 500 feet away become hazy to an observer.

Science News Letter, November 13, 1948

MEDICINE

Boys' Heads Are Bigger

➤ WORRIED about the size of the baby's head? Does it seem too large or too small?

Usually there is no foundation for such worries, but physicians now have a simple new technique to make sure. A simple chart on head size has just been devised by two University of California Medical School physicians, Drs. Henry K. Silver and William C. Deamer, and published in the JOURNAL OF PEDIATRICS.

In most cases what appears to be an abnormally large or small head may be simply a hereditary characteristic. A few measurements over a period of time, using the chart, will determine if the head is growing at a normal rate, in which case there is no need for worry.

However, in a very few cases an abnormally small head may indicate mental retardation or on oversize head may warn of a dangerous increase in cerebral fluid and possible atrophy of the brain.

In these cases "changes in the growth pattern of the head, as compared to normal, may indicate the seriousness of the condition before marked abnormality of shape, loss of vision, retardation of mental growth or other sequelae have occurred," the physicians write. In many cases serious consequences may be averted.

The physicians point out that in the past it has been difficult for the average physician to take routine measurements of head size, because the data on head size have been buried in lengthy and complex tables, the interpretation of which is difficult and time-consuming.

Their chart is a graphic simplification of these tables, which makes it possible for the practicing physician to compare head size in an infant up to two years with that of the average child.

The chart indicates that boys have larger heads than girls at all ages. At birth the head size for girls ranges from 12.75 to 14 inches, while for boys the range is 13 to 14.25 inches. At two years the normal for girls is 18.25 to 19.5, and for boys, from 18.75 to 20 inches. In all cases 20% of all children will have head circumferences which fall on either side of these sizes without being abnormal.

Science News Letter, November 13, 1948

ENGINEERING

New Diesel Oil Cuts Wear As Much as Nine-Tenths

➤ A NEW lubricating oil capable of reducing wear in diesel engines as much as nine-tenths was revealed in Tulsa, Okla., to the Society of Automotive Engineers by the Shell Oil Company.

It is a compounded heavy-duty type, which not only reduces wear, but promotes engine cleanliness, possesses oxidation stability at high level, and excels conventional heavy-type oils in stability at high piston temperatures.

The lubricant even corrects corrosive wear and fouling, whether caused by operating conditions, sulfurous fuel, or both, the engineers were told by J. A. Edgar, J. M. Plantferber and R. F. Bergstrom, all of the Shell Company, Martinez, Calif. The contents were not revealed.

Science News Letter, November 13, 1948

PHYSIOLOGY

Skin Coloring and Tan Depend on Skin's Chemicals

➤ SKIN COLOR and the skin tan produced under the sun's rays depend a lot on the copper and SH (short for sulfhydryl) in the skin, it appears from research by Drs. Peter Flesch and Stephen Rothman of the University of Chicago.

Formation of melanin, the pigment that gives the dark color to skin, is prevented by SH compounds. The sun's rays apparently eliminate the melanin-checking action of the SH. Copper comes into the situation through a copper-containing enzyme, tyrosinase. The action of this chemical is familiar to anyone who has seen peeled potatoes or mushrooms darken when exposed to the air.

The SH compounds keep balance with the copper-containing enzymes in the resting melanin cells, the scientists suggest. When ultraviolet rays or other agents act on the skin, the balance is upset. The SH groups are put out of action and the copper-containing enzyme can act freely to produce the skin pigment.

Details of the study are reported in the journal, SCIENCE (Nov. 5).

Science News Letter, November 13, 1948

PSYCHOLOGY

Male Declared More Emotional than Female

➤ THE MALE is the more emotional of the two sexes, despite popular opinion. Authority: Dr. John E. Anderson, psychologist of the University of Minnesota, who reported the results of his research on emotions to the Mooseheart Symposium on Feelings and Emotions in Mooseheart, Ill.

The number of emotional situations increases as a person grows older. But just what you get emotional about changes as you solve life's problems one by one and leave emotion-provoking situations behind you, Dr. Anderson said.

You may not seem as emotional when you are grown as you did as a child or adolescent. But that may be due to the cumulative effect of social pressures to hide and control expression of your feelings.

Men, particularly, Dr. Anderson pointed out, are subject to great social pressure to hide and inhibit emotional expression and so become more "manly."

Emotions are no longer thought of by psychologists as isolated and distinct processes, he explained. Instead, they are changes in the level of energy expenditure related to the mobilizing of your personal resources to meet a new situation. That is why the emotions are constantly changing as an individual meets new situations and they one by one become an old story to him.

Actually no one knows just how much of the apparent complacency and poise of the older person is due to the accumulation of experience which dulls his feeling and how much to the social pressure which makes him play the role of calmness.

Science News Letter, November 13, 1948

ARCHAEOLOGY

Red Sea Level Has Not Changed in 3500 Years

➤ THE RED SEA, whose waters are given Biblical credit for the miraculous overwhelming of Pharaoh's army, has undergone no natural change in level worth speaking of in 3,500 years. This was disclosed before the meeting of the American Philosophical Society in Philadelphia by Prof. William F. Albright of the Johns Hopkins University, who served as archaeologist with the University of California African Expedition.

The party investigated the western shore of the Sinai peninsula, which was the wilderness where the Children of Israel wandered during their long pilgrimage. There they discovered the main point of embarkation for the Egyptian turquoise miners who worked in the region about 1500 B. C. This point was only a few yards above sea level, and soundings proved that it had never been under water for any length of time.

Although the Sinai region is a bleak desert now, Prof. Albright added, it has not always been such a barren wilderness as it was even in the time of Moses. Evidence was found by other parties of the expedition that only a few thousand years before then it had been a good hunting-ground for men of the later Stone Age.

Among the archaeological accomplishments resulting from the expedition has been "the successful decipherment of the so-called proto-Sinaitic alphabet, which is the oldest known form of the ancestral alphabet, to which all existing alphabets go back."

Science News Letter, November 13, 1948

IN SCIEN

MEDICINE

Cysts Found Responsible In Nerve Root Pain

➤ SCIATICA and other nerve root pain may in some cases be due to cysts on the front of the nerve roots in the spine instead of to a ruptured disk between the vertebrae, Dr. I. M. Tarlov of New York reports in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Nov. 6).

The day after the operation at which the cyst was discovered and removed the patient he reports was free for the first time in months from pain in her leg. She left the hospital well and happy on the eleventh day and within two months was able to carry on with her household duties.

In this patient's case the pain, numbness, tingling and disability were at first thought due to pressure on the nerve root of a ruptured disk between the vertebrae. But at operation the disk was found normal. Further examination and cutting away of tissue disclosed the cyst.

Dr. Tarlov urges surgeons to look for cysts in similar cases. He believes the condition is not rare. In the course of autopsy examinations he found such cysts in five of 30 adults, and a Swedish scientist has reported finding eight in 17 autopsies. About 10% of patients thought to have ruptured intervertebral disks turn out not to have them when the surgeon looks for them at operation. Cysts hidden beneath the arch of the sacrum may, he thinks, be the cause of the pain and other symptoms in these cases.

Science News Letter, November 13, 1948

ENGINEERING

Lubrication Simplified In Air Force Planes

➤ SIMPLIFICATION of U. S. Air Force lubrication requirements through standardization of lubricants and lubricating practices has progressed to a point where even the complex and intricate B-50 Superfortress requires only one grease and one oil, the Society of Automotive Engineers was told in Tulsa, Okla., by E. M. Glass, of the Air Material Command, Dayton, Ohio.

Standardization has resulted in reducing to 20 from 400 the number of different lubricants stocked by the 2,300 Air Force installations for maintaining 300,000 planes of 80 different models, he stated. Under the new program, cooperation between design and lubrication engineers is possible, while maintenance engineers are rid of jobs of plane lubrication which have become routine.

Science News Letter, November 13, 1948

NE FIELDS

AERONAUTICS

Ram-Jet Engines Tested On F-80 Wing Tips

See Front Cover

➤ RAM-JET ENGINES mounted on the wing tips of a U. S. Air Force Lockheed F-80 Shooting Star have been undergoing flight tests for nearly a year at Van Nuys, California, and Muroc, California, Air Force Base. The tests have been carried out by Lockheed personnel under the sponsorship of the Air Force.

The ram-jets used in the tests were made by the Marquardt Aircraft Corporation, Venice, California, and are of two types, one seven feet long and 20 inches in diameter, the other 10 feet long and 30 inches in diameter.

A high air speed is necessary to sufficiently compress the intake air for ram-jet engines to operate efficiently, so a "flying test stand" in the form of an F-80 was used. After the F-80 reached the required speed through its standard turbo-jet engine, the ram-jets were ignited. Then the turbo-jet was turned off and the craft was powered by ram-jet alone, as shown on the cover of this week's SCIENCE NEWS LETTER. It is the first man-carrying aircraft to fly under such conditions.

Mechanically simple, ram-jets are merely tubes made of stainless steel, aluminum and magnesium incorporating a grid where a liquid fuel is burned with the compressed air that is produced by the ram effect resulting from the high speed of the plane.

Test flights have been made by the F-80 to determine air and fuel flow, thrust and drag of the ram-jet units. The tests were made to improve and develop the ram-jet engines, not to increase the efficiency of the F-80.

The flying test stand is equipped with automatic observing systems and a motion picture camera to record instrument readings in flight.

Science News Letter, November 13, 1948

CHEMISTRY

New Home Spray Emulsion Aids Dust Allergy Victims

➤ ASTHMA and other allergy sufferers whose misery comes from house dust can have their homes made more nearly non-allergic by a new product reported in the ANNALS OF ALLERGY (Sept.-Oct.).

The product is called Dust-Seal. It immobilizes allergy-causing house dusts in rugs, carpets and other fabrics, as shown by the disappearance of symptoms in dust-sensitive persons, Dr. Arthur F. Coca of Pearl River, N. Y., reports.

Some of the germs of colds and other respiratory diseases would also be immobilized since the method is a modification of the floor and fabric oiling found effective during the war in checking the spread of respiratory infection.

Dust-Seal is a water-emulsifiable mineral oil. It comes as a white paste which the housewife mixes with water and sprays on carpets and upholstered furniture, pillows and mattresses. The vacuum cleaner or the garden watering can may be used for the spraying.

The spray is odorless and quickly becomes quite invisible. It is non-volatile and the fabric is not made more than usually inflammable. It is said not to cause "notable injury even to fine Chinese and Turkish rugs."

Dust-Seal is manufactured by L. S. Green Associates of New York.

Science News Letter, November 13, 1948

PUBLIC HEALTH

Air Pollution Problem Confronts Administration

➤ HERE'S a national health protection job for the new Congress and the next administration: A clean-up of the air in industrial areas, so as to prevent another Donora tragedy in which industrial fumes held by fog killed a score of persons and made many others ill.

The Donora town council requested federal aid. But the federal health service cannot move into such situations as rapidly as might be either expected or helpful because it must wait for a request from State Health Departments. In this instance, election-day closing of state offices at Harrisburg, Pa., delayed by at least a day the aid the federal health service can give.

The danger is over in Donora now that the fog has been dispelled, and the same combination of fog and no wind may not happen again in years. Even if it did, the health danger could be largely prevented if the industry spent a good deal of money to prevent release of dangerous fumes into the air.

Donora is not alone in its air pollution danger. Los Angeles residents go about with inflamed eyes and sore throats much of the time because of air pollution from the industries in and around the city. Other industrial regions face much the same problems.

St. Louis is a notable example of a city that cleaned up its air, with resultant health benefits to its citizens. But while many cities have ordinances for control of air pollution and for smoke abatement, almost no state has any such legislation.

The problem is big enough, in the opinion of Dr. J. G. Townsend, head of the industrial hygiene division of the U. S. Public Health Service, to warrant more attention on the federal level.

Science News Letter, November 13, 1948

ICHTHYOLOGY

Rare Frilled Shark Caught Off Coast of California

➤ A FRILLED SHARK, one of the rarest of creatures that swim the sea, has been caught off the coast of California by a Santa Barbara fisherman named Pete Metson. Previously caught specimens had been known only from Japan and the west coast of Europe.

The frilled shark gets its name from a series of frilled folds that cover its six gill-slits, which are quite naked in practically all other species of sharks. The fish itself is long and very slender, so that it looks more like an eel than a shark. Mr. Metson's specimen was just under five feet long when caught.

Realizing that he had something unusual, Mr. Metson cleaned his specimen immediately and put it on ice. Later, after his boat had returned to base, he had it frozen. It is now at the California Academy of Sciences in San Francisco.

A careful anatomical study of the shark has been made by Dr. Elmer R. Noble of the University of California's Santa Barbara College. A colleague, Dr. Willard L. McRary, has assayed its liver oil for vitamin A content, which he found very low. They report their results in the journal, SCIENCE (Oct. 8).

Science News Letter, November 13, 1948

ENGINEERING

Oil Deficiencies Result in Over-Consumption in Cars

➤ EXCESSIVE oil consumption in automobile engines is not always due to mechanical defects in the engine but may derive from physical deficiencies in the oil, the Society of Automotive Engineers was told in Tulsa, Okla., by C. W. Georgi of Quaker State Oil Refining Corporation.

Although other properties may have greater significance from a technical aspect, oil consumption is of great practical value from the popular viewpoint, he said. Oil consumption tends to be the chief yardstick by which many motorists and operators judge oil quality. The investigations made by him on which he reported were with engines in good mechanical condition.

The properties of motor oils which have the greatest effect on consumption tendencies are volatility, viscosity and viscosity index, he stated. Oils having a low volatility within defined limits, high viscosity and high viscosity index tend to possess the lowest consumption characteristics.

Road tests to evaluate oil consumption were made in different vehicles due to the many variables involved. Tests in only a few cars give misleading results. Laboratory engine tests were made also. With proper selection and control of operating conditions, they gave results which correlate well with road tests.

Science News Letter, November 13, 1948

GENERAL SCIENCE

Work of Young Scientists

Science fairs, to which boys and girls from grade schools to high school graduates are entrants, are for some the first step toward recognition as scientists.

By RON ROSS

➤ HERE ARE some of the things youngsters in your neighborhood may be working on:

Conversion of energy by a talking beam of light.
Six-inch reflecting telescope.
Space ship to Mars.
Manufacture of sulfuric acid.
Liquefaction of gases.
Home-made microscope.

These were some of the entries in a Science Fair held last spring in St. Louis. Projects such as these are now being developed by youngsters who will make entries in science fairs in communities all over the nation during the coming school year.

Entrants in science fairs are boys and girls from the grade schools to high school graduates. These young scientists put their projects on display at the fairs held in schools and community centers in their home towns.

New Departure

They are a new departure from the traditional county and state fairs. The girls who once might have entered jams or needlework in a county fair now may present an explanation of some nuclear phenomenon, a demonstration of making plastics or a dissected biology specimen.

Boys who might have entered the more traditional fair with a carefully groomed calf, can now be found explaining the theory of engines, building telescopes or illustrating the laws of chemistry.

Science fairs are generally held in the spring, with the cooperation of schools, newspapers and other institutions in the community. In a large auditorium, the youngsters set up the exhibits of their work. Months and even years of study, collecting and experimenting sometimes go into these exhibits.

Judges award prizes for the best work in the different classifications, while proud parents and other friends tour the exhibits. But the youngsters generally spend most of their time during the fair discussing their work and the other exhibits with their young fellow scientists.

For some of the entrants, the science fair is the first step toward recognition as a scientist, perhaps aided along the way by a scholarship award for a prize project. Others are encouraged toward a satisfying hobby. Some, who have ambitions in science, discover they have greater aptitude in other fields.

Rock collections, model airplanes and such familiar hobbies of young people form only a part of the entries at the fair. A well-informed adult will be startled to discover the scientific achievement of many high school students who enter science fairs.

Still new compared with the more traditional fair, science fairs first began more than two decades ago with those held by the American Institute of the City of New York. These have continued while many other cities and communities have taken up the idea.

Supporting the development of the science fairs is an organization of a third of a million young scientists, Science Clubs of America. These young scientists are members of the 15,000 science clubs in this country and abroad. From this group of science-minded young people in junior and senior high schools come many of the entrants and winners in the science fairs.

There are such clubs in your locality. Science Service is cooperating with school officials and scientists throughout the nation in providing the information and know-how for science club organization and activities. Any teacher or interested adult who sponsors a science club can, without any cost whatever, affiliate it with the national Science Clubs of America and receive a hundred-page handbook full of data and aids to science hobby activities.

The young science enthusiasts have fun in carrying out their science projects. But what they do is very far from mere child's play.

Organizations Cooperate

Leading science organizations, in government, industry and elsewhere, cooperate in suggested projects. Many of the investigative tasks are of direct, practical benefit to the communities in which the science club members live.

The professional scientists and teachers also do their bit to help this youth movement in science. State science academies, universities, colleges, teacher associations, museums and other organizations are cooperating.

Each year Science Clubs of America conducts the national Science Talent Search which culminates in the award of the Westinghouse Science Scholarships at the Science Talent Institute at Washington. This is a crowning activity of the science clubs and in many cases the seniors who participate have been working on their science hobbies during the whole six years of their junior and senior high school work.

Girls as well as boys are members of the science clubs; most of the activities can be carried on as effectively by girls as by boys. In the Science Talent Search each year the proportion of girls who win honors is determined by the ratio of girls to boys who enter.

The science club activities of high school students have won approval from national and science leaders as a serious and important aid to the nation's science program.

Need of Scientists

America finished the war with a realization that there were not nearly enough scientists and development engineers available to discover new basic knowledge, do the necessary industrial and military research and train the oncoming scientific generation.

Many of the science club members in the schools of the nation this fall are receiving their first contact with science and its possibilities. The extent to which they and their teachers develop science club opportunities will determine to a large degree how well the urgent national need for scientists will be answered in the future.

For every club member who will become a professional scientist there are hundreds who will not. For most of the school science hobbyists, science will remain a hobby throughout life, whether they become lawyers, merchants, housewives or follow some

SCIENTIST IN THE MAKING— This junior high miss dissects an insect as part of her Science Clubs of America activity.

FOLLOWING IN DAD'S FOOTSTEPS—Paul Condon and his brother Joe, sons of Dr. Edward U. Condon, director of the National Bureau of Standards, display their projects at a Washington, D. C., Science Fair.

other pursuit outside science. For these non-professional scientists of tomorrow, the serious fun they have in science clubs is one of the richest experiences of their youth. They will be better equipped to live in a scintific world and control the results of science so that civilization will progress rather than be wiped out.

Science fairs are fun for young scientists who enter—and for their parents and friends and the adult sponsors of the fairs—but they are also an important event in building intelligent leaders of the future.

Anyone interested in science clubs can get information by writing to Science Service, 1719 N St., N. W., Washington 6, D. C.

Science News Letter, November 13, 1948

MEDICINE

Outbreak of Rash Among Sailors Traced to Moths

➤ A SKIN ERUPTION which attacked about two-thirds of an American merchant marine crew which entered a Venezuelan port was traced to a tropical moth. Three Boston physicians suggest that in any outbreak of rash the moth should be suspected, especially in crew members of ships or airplanes which enter South American ports.

On the first night the American crew anchored in port, a swarm of moths invaded the ship. The sailors killed them by crushing them between their fingers. Shortly afterwards some of the men noticed "small white itching bumps" on their skins and on the following morning their bodies were covered with a rash except for the face, palms and soles of the feet.

Other crew members noted the eruption on arising in the morning. This was traced to the bed linen which had been changed the night before. The closet in which fresh sheets were stored was made of meshed metal which permitted the entrance of the moths, several of which were found on the closet floor and some suffocated between the stacked sheets.

Twenty-nine of the 31 sailors who got the rash were treated at the United States Marine Hospital in Brighton, Mass., by Drs. William R. Hill, A. Daniel Rubenstein, and Joseph Kovacs, Jr., who present their report in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Nov. 6).

The eruption developed from a few minutes to a few hours after contact with the moth or with moth-stained bed sheets, the physicians state. Removal of the patient from the source of contact, a soap and water bath, a change to clean clothing and application of an alkaline wash usually brought relief. The patients became well in four to seven days.

The moth has been identified as the female of the genus Hylesia by V. Nabokov of the Museum of Comparative Zoology, Harvard University. These moths belong to the family Saturniidae, sometimes called, in English, peacock or silk moths, according to the report. They are attracted by light which explains their being on board ship, as the vessel had powerful lights.

Science News Letter, November 13, 1948

PLANT PHYSIOLOGY

Radioactive Molybdenum Shows Need of It in Plants

➤ MOLYBDENUM, the steel-maker's "seasoning," is also needed in extremely small amounts by plants—as little as ten parts per billion by fresh weight. To trace these minute quantities into and through plants, Drs. P. R. Stout and W. R. Meagher, University of California plant physiologists, have made use of radioactive molybdenum isotopes, supplied to plants that had been deprived of even the slightest speck of the element.

Molybdenum-starved plants show two outstanding symptoms: they lose the green color in their leaves, and they become unable to make use of nitrates taken up by their roots, piling these necessary salts up in their leaves to as much as 12 times normal concentration.

When molybdenum is supplied in even very low concentration these conditions are corrected in a matter of hours. The healthy green color re-develops in the leaves, and the abnormal concentration of nitrates is reduced to a more usual level.

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Do You Know?

Tea and butter *rationing* will continue through 1949 in Australia.

Among the most pugnacious of the carnivorous insects is the *tiger beetle*, which feeds exclusively on other animals.

Decorative *evergreens*, around the house, are often damaged by snow breakage during the winter; this can be largely prevented by winding them with a soft cord to bind the tops together.

Wafers with a cheese-like flavor and the texture of potato chips contain one-third skim-milk solids and two-thirds potato solids; boiled potato and skim-milk are thoroughly mixed and seasoned, then spread thin, dried and toasted.

Sponge iron, so called from its spongy character, is metallic iron extracted from ore without bringing it to the melting point; by using coal, char, or gas as a reducing agent, oxygen is taken from the ore at temperatures below the melting point of iron oxide.

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traced in plants by placing them on photographic film and letting the radioactivity register itself in the sensitive emulsion, it was found that the element becomes concentrated almost entirely in the leaves, especially in the spaces between the veins. Very little of it remains in the stems, or even in the leaf-veins.

In another series of experiments in the same laboratory, Dr. Richard B. Walker, now of the University of Washington, studied the effects of supplemental supplies of molybdenum on plants growing in molybdenum-deficient soils. Here again, the plants grew pale and sickly-looking, and were restored to normal by the treatment. It was even possible to give them their restorative doses of molybdenum by painting a solution containing it on their leaves.

Results of both these research projects are presented in the journal, SCIENCE (Oct. 29).

Science News Letter, November 13, 1948

MEDICINE

Tantalum Foil Tubes for Nerve Surgery Patented

➤ TUBES of thin tantalum metal foil, for use in nerve surgery, have been patented by Dr. Paul A. Weiss, the University of Chicago neurologist who devised the method. Rights in U. S. patent 2,451,703, just granted, are assigned to the government.

Tantalum, a grayish-white metal little known until recently, has become a preferred material in many surgical uses because it does not corrode in the presence of any of the body fluids and has no irritating action on the tissues. For nerve surgery it must be used exceedingly thin; five ten-thousandths of an inch has been found the best thickness. It must also be heat-treated to increase its resilience.

To make his nerve-mending tubes, Dr. Weiss wraps a piece of tantalum foil around a quartz tube of the desired diameter, binding it on with fine steel wire. He runs a steel rod through the quartz tube, for heat-conducting purposes, and puts the whole into an electric furnace for a minute or so at 800 degrees Centigrade. After cooling, the tube is stripped off and trimmed ready for use.

Dr. Weiss has also used nylon and short pieces of artery in his nerve-mending procedure. These materials, however, are not considered in the present patent.

Science News Letter, November 13, 1948

ORNITHOLOGY

If Pheasant Is Purple, You Aren't Seeing Things

➤ IF A PHEASANT with purple, green or blue feathers crosses your path, you may not be "seeing things." The bird will be real—and the rainbow feather-colors will be real, too.

Outdoor scientists sometimes dye birds' feathers with hues not found in nature as a means of quick identification at a distance. This enables them to keep track of their movements and learn the extent of their range.

Newest techniques and dyes useful in this particular branch of applied ornithology were described in the JOURNAL OF WILDLIFE MANAGEMENT (October) by Dr. L. A. Wadkins of Washington State College. He has made use of 14 different dyes in a variety of solvents. Best results, on the whole, were obtained with 33% alcohol.

Science News Letter, November 13, 1948

AGRICULTURE

More Sunshine Puts More Sugar in Apples

➤ APPLES have more sugar if they get more sunshine during the growing season. This was learned at Cornell's Agricultural Experiment Station, Ithaca, N. Y., in a long-time study aimed at correlating some of the factors like rainfall, amount of sunshine, and temperatures to the keeping quality of apples.

Another discovery was that the higher the temperatures during the last six weeks before harvest, the greater has been the amount of scald in storage. The scientists will test this information further during the 1948-49 storage season, based on predictions made the last six weeks before harvest. Such knowledge, they say, will be of value to growers, who could move scald-susceptible varieties out of storage rapidly if considerable scald were expected.

Science News Letter, November 13, 1948

The mysteries of mathematics are revealed in a series of twenty chapters on "THE MEANING OF COURSES IN MATHEMATICS" now running in the MATHEMATICS MAGAZINE. If you never understood mathematics well or want to understand it better, here is your opportunity at trivial cost. No special training is required to understand and enjoy these articles, ranging from beginning algebra through most graduate courses, and colored by the individualities of the sixteen mathematicians who are writing them.

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NOTICE: Add 20 percent Federal Excise Tax to your remittance if you buy both the Binocular Optics and Metal Parts.

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COMPLETE OPTICS & METAL PARTS—Model M-13A1, 6 x 30 Binoculars (Waterproof Model). Everything you need—ready for assembly. When finished will look like a regular factory job costing $102 to $120. The Optics are new, in perfect or near-perfect condition. Have new low reflection coating. Metal parts are new and perfect, all completely finished. No machining required. Bodies factory hinged and covered. Complete assembly instructions included.

Stock No. 830-Q ..... **$40.00 Postpaid**
plus $8.00 tax ..... **Total $48.00**

METAL PARTS ONLY—Model M-13A1, 6 x 30 Binoculars. No Optics. Same Metal Parts as described for Stock No. 830-Q.

Stock No. 832-Q—6 x 30
Metal Parts ..... **$25.00 Postpaid**

OPTICS FOR 6 x 30 BINOCULARS (No Metal Parts.) Perfect and low reflection coated.
Stock No. 5130-Q ..... **$15.00 Postpaid**

SAME OPTICS AS ABOVE — Coated — but slight seconds.
Stock No. 5124-Q ..... **$12.75 Postpaid**

If you buy both the Binocular Optics and the Binocular Metal Parts, your purchase becomes subject to 20% Federal Excise Tax. Be sure to add amount covering tax to your remittance or your order cannot be filled.

OPTICS AND METAL PARTS are available for Monoculars (1/3 a Binocular). For complete details, write for Bulletin Q.

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Above Polarizing Attachment also adaptable to Govt. 6 x 30 Binoculars with substitution of special Eyecups.

Stock No. 20,010-Q—
6 x 30 Eyecups ..... **75c pr. Postpaid**

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Stock No. 941-Q ..... **$3.00 Postpaid**

8 POWER ELBOW TELESCOPE

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Big 2 in. diameter objective. All lenses Achromatic. Amici-prism erects the image. Four built-in filters—clear, amber, neutral and red. Slightly used condition but all guaranteed for perfect working order. Weight 5 lbs. Can be carried but a trifle bulky. Excellent for finder on Astronomical Telescope.

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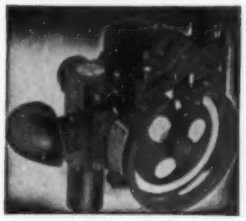

These Army Air Forces Bubble Sextants cost the Govt. about $125.00 each. A real bargain at our price at $12.50! Wooden carrying case included. Also auxiliary items. Wartime used. **BUT COMPLETELY REPAIRED, COLLIMATED AND PUT IN GOOD WORKING ORDER.** If not satisfied that Sextant is exactly as represented, return within 10 days for refund. Full directions for use accompany each shipment.

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Same Sextant as above, but **BRAND NEW** and with Automatic Electric Averaging Device and Illuminated Averaging Disc for nighttime use, Govt. cost $217. Though brand new we have re-checked Bubble and Collimation and **GUARANTEE** perfect working order.

Stock No. 933-Q ..... **$22.50 Postpaid**

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SIMPLE LENS KIT

Some Govt. surplus, some commercial surplus, some shipped rejects, some perfect, few coated . . . in any event an excellent bargain. Containing Plano Convex, Double Convex, Concave, Miniscus Lenses. Dia. range 5mm to 40mm. Assorted focal lengths.

Stock No. 5-Q—45 lenses ..... **$5.00 Postpaid**
Stock No. 10-Q—80 lenses ..... **$10.00 Postpaid**

10 LENS KIT—THE LENS CRAFTERS DELIGHT! Kit includes illustrated booklet. . . . A specific project for every lens in the kit. Use these lenses in photography for copying, ULTRA CLOSE-UP SHOTS, Microphotography, for "Dummy Camera," Kodachrome Viewer, Detachable Reflex View Finder for 35mm cameras, Stereoscopic Viewer, ground glass and enlarging focusing aids. And for dozens of other uses in experimental optics, building TELESCOPES, low power Microscopes, etc.

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RADIO

Ionized Clouds at Night

➤ CLOUDS of ionized atmosphere, invisible to the human eye, are all that remain at night of the "radio roof" that during the day enables us to hear distant broadcasts.

These clouds are about 55 to 65 miles above the earth's surface, R. A. Helliwell of Stanford University reported at the joint meeting of the International Scientific Radio Union, American Section, and Institute of Radio Engineers in Washington.

Whereas the highest radio-reflecting layers, extending from around 100 to 250 miles above the earth, are always present, the lower layers come in with sunlight. The electrons, knocked out of atoms by the sun's ultraviolet light, tend to recombine when sunlight is withdrawn.

These patchy clouds of ionization are probably blown about by the high-velocity winds known to exist at ionospheric heights, Mr. Helliwell stated. At times the lowest of these clouds of ions remain substantially stable for as long as ten minutes, again within a few minutes they will be five miles lower or higher than before.

The ionized layers are assumed to be quite patchy in the lower fringe of the ionosphere. Echoes from radio signals, sent directly upward from a broadcasting station, are sometimes received from two clouds, one six to ten miles above the other. While some signals are reflected from low-level clouds of ionization, some penetrate between these patches and are reflected from clouds at a higher level.

Science News Letter, November 13, 1948

CHEMISTRY

Quartz Crystals Made

➤ SYNTHETIC quartz crystals, suitable for use in radio equipment, have now been produced in high-grade quality under the sponsorship of the Army Signal Corps.

During the month of September, the Brush Development Company of Cleveland delivered to the Signal Corps the largest synthetic quartz crystal, essentially free from defects, known to have been produced from any artificial source. The greatest dimensions of the sample are equal to the diameter of a silver dollar.

Quartz crystals are grown by deposition from a solution containing the raw material derived from quartz-sand or other silica materials, in a closed metallic container at a temperature of about 750 degrees Fahrenheit and at pressures as high as several thousand times that of the atmosphere. Individual molecules are deposited on a seed crystal in a regular manner to produce a larger model with the same shape as the seed.

It is believed that mass production of synthetic quartz crystals may be feasible, but considerable laboratory work must be done before they can be made economically. Their manufacture in this country would make the nation independent of natural quartz crystals which now come principally from Brazil. Relatively little satisfactory quartz for the purpose has ever been found in the United States.

The quartz crystals are used in radio transmitters, and in other applications, to regulate radio oscillation or radio wave frequency. A quartz crystal is what scientists call a piezoelectrical substance. It forms electrical charges on its surface when mechanically stressed, or exhibits mechanical strains when electrically charged. Other substances have the same properties, but none have been found that are as satisfactory in use or as economical as quartz.

Science News Letter, November 13, 1948

QUICK-READING TEMPERATURE-CONVERSION TABLES

For speed, when you're converting degrees F to C, and vice versa, you can now use a simple, compact "Sauveur-type" table all the way from absolute zero to 3350 C and 6062 F, in increments of one degree.

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Books of the Week

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A. S. T. M. STANDARDS ON TEXTILE MATERIALS (WITH RELATED INFORMATION)—A. S. T. M. Committee D-13—*American Society for Testing Materials*, 547 p., illus., paper, $4.35. Specifications, tolerances, methods of testing, and definitions and terms. The photomicrographs are interesting.

AMERICAN HIGH SCHOOL BIOLOGY — Charlotte L. Grant, H. Keith Cady and Nathan A. Neal—*Harper*, 888 p., illus., $3.28. Contributing in an important measure to the value of this text are the beautiful photographs with which it is illustrated.

ANT HILL ODYSSEY—William M. Mann—*Little, Brown*, 338 p., illus., $3.50. Whether you are interested in insects or in the adventures of a delightful person you will want to read this autobiography of the director of the National Zoological Park.

BACTERIAL AND MYCOTIC INFECTIONS OF MAN—Rene J. Dubos — *Lippincott*, 785 p., illus., $5.00. A text from the Rockefeller Institute for Medical Research aided by a grant from the National Foundation for Infantile Paralysis. Planned to meet the need for texts which interpret current research and to recognize the trend toward the increasing amount of study time devoted to the subjects.

CAUSES OF INDUSTRIAL PEACE UNDER COLLECTIVE BARGAINING, CASE STUDIES 2: The Libbey-Owens-Ford Glass Company and the Federation of Glass, Ceramic and Silica Sand Workers of America—Frederick H. Harbison and King Carr—*National Planning Association*, 61 p., paper, $1.00.

COBALT—Roland S. Young—*Reinhold*, 181 p., illus., $5.00. A monograph dealing with the chemistry and metallurgy of cobalt and also its biological importance.

A CONCISE HISTORY OF MATHEMATICS—Dirk J. Struik—*Dover*, 299 p., 2 vol., illus., $3.00. A readable account beginning with prehistoric times.

CRIME AND THE MIND: An Outline of Psychiatric Criminology—Walter Bromberg—*Lippincott*, 219 p., $4.50. Based on the clinical study of hundreds of convicted criminals and written by the senior psychiatrist at Bellevue Hospital.

FOOD PRODUCTS—Henry C. Sherman—*Macmillan*, 4th ed., 428 p., illus., $4.80. A textbook on nutrition.

GERMICIDES, ANTISEPTICS AND DISINFECTANTS FOR HOSPITAL USE — Dewey H. Palmer—*Hospital Bureau of Standards and Supplies*, 15 p., paper, $1.00. Technical information.

HALLMARKS OF MANKIND—Frederic Wood Jones—*Williams and Wilkins*, 86 p., illus., $2.50. The British author holds that man is more primitive in structure than living apes but has his own structural specializations that distinguish him from other mammals.

LIVES OF MASTER SURGEONS—Richard A. Leonardo — *Froben*, 469 p., illus., $6.00. Brief biographies, alphabetically arranged.

MICROBES MILITANT, A CHALLENGE TO MAN: The Story of Modern Preventive Medicine and Control of Infectious Diseases—Frederick Eberson — *Ronald*, rev. ed., 401 p., illus., $4.50. Technical subject matter written in such a way as to be of interest to the general reader.

PAPERS PRESENTED AT THE NAVAL ORDNANCE LABORATORY MAGNETIC MATERIALS SYMPOSIUM—*U. S. Naval Ordnance Laboratory*, 61 p., illus., paper, $8.75, microfilm, $3.00. Price correction.

PREHISTORIC MEN—Robert J. Braidwood—*Chicago Natural History Museum*, 117 p., illus., paper, 50 cents. A simply written book about our earliest ancestors and what is known of them.

THE SHAME OF THE STATES—Albert Deutsch—*Harcourt, Brace*, 188 p., illus., $3.00. A graphic description of the deplorable conditions found in state mental hospitals dramatically emphasized by documentary photographs.

STUDIES IN ANALYTICAL PSYCHOLOGY—Gerhard Adler—*Norton*, 250 p., illus., $4.00. Conclusions from 15 years of practice by a British analytical psychologist including an exposition of Jung's contribution.

TEACHING ELEMENTARY SCIENCE: Suggestions for Classroom Teachers — Glenn O. Blough and Paul E. Blackwood—*Govt. Printing Office*, 40 p., illus., paper, 15 cents. It is not necessary to have a lot of expensive equipment in order to let children begin to find out by experiment. Here are helpful ideas to start you off.

TECHNIC OF MEDICATION—Austin Smith—*Lippincott*, 255 p., illus., $4.00. For medical student and general practitioner.

TO MAKE THE PEOPLE STRONG — A. Edward Stuntz — *Macmillan*, 298 p., $3.50. On how the peoples of the Americas are making life better through cooperation on public health, increasing food yields, education and other similar fields.

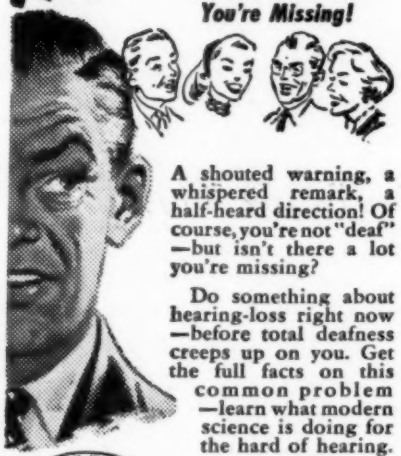
WOMAN'S MEDICAL PROBLEMS—Maxine Davis—*McGraw-Hill*, 2d ed., 242 p., $3.00. Helpful information consisting in large part of articles that originally appeared in *Good Housekeeping*.

A STUDY OF FISH—Chapman Pincher—*Duell*, 343 p., illus., $4.00. Information of interest to the fisherman and general reader. Illustrated with drawings by the author.

Science News Letter, November 13, 1948

A fine legal line between noise and free speech may have to be defined in New York because of a new ordinance regulating the use of *sound trucks*.

WHY BE
half deaf
There's SO Much You're Missing!



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ELECTRIC HUMIDIFIER, for use in the home, draws air through a fiber filter while a continuous waterfall action supplies the needed moisture. The air as discharged is clean, fresh, filtered and moisturized. The device operates on the ordinary household electric current.

Science News Letter, November 13, 1948

NUT-SHELLER clips small portions of the shell away instead of cracking the entire shell as done by ordinary nut openers. It is a handtool of plier-like construction with cutting teeth of special steel sharpened to a very fine edge.

Science News Letter, November 13, 1948

REFLECTIVE SHEETING for automobiles permits the shape and color of the vehicle to be plainly visible at night under the headlights of approaching cars. The sheeting is made with a smooth, glossy surface that does not change the daytime appearance of the car. It comes with a solvent-activated adhesive which grips on contact.

Science News Letter, November 13, 1948

WIRELESS HEARING aid, shown in the picture, is carried in the pocket or handbag, and held to the ear only when wanted. It is a sound amplifier, complete with microphone, receiver, batteries, midget vacuum tubes, transformer and volume control. It is designed for persons with slight hearing losses.

Science News Letter, November 13, 1948

SHAVING BRUSH, whose handle is a receptacle to hold the shaving cream, is supplied with the lathering material in the quantity desired by the turn of a knob on the outer end of the handle. The cream passes through the wet brush, becoming a lather ready for the beard. A cap covers the brush when not in use.

Science News Letter, November 13, 1948

SNAP-ON VISORS, for use on automobile windshields, are made of highly polished aluminum and equipped with thin stainless steel plates which slip under the rubber seal and frame. The two sections are held rigid by the use of a tie-bolt connecting them over the center windshield bar.

Science News Letter, November 13, 1948

ICE GRIPPERS, an improved type to fit over the shoe, can be slipped on or off in a jiffy and can be carried in a vest pocket. They are hardened rust-proof steel elastic web bands, and a heavy-duty type has half-inch teeth.

Science News Letter, November 13, 1948

BOWLING BAG, to hold the favorite bowling ball, is made of leather but its base is a molded plastic with an inside built-in retainer cup in which the ball rests. The plastic base is attached to the leather sides with two rows of machine stitching.

Science News Letter, November 13, 1948

• Nature Ramblings *by Frank Thone* •

NEXT SPRING'S Easter bonnets and dainty gowns are already being made, and shortly after Christmas they will be moving onto the merchants' shelves. But even the fabricators of fashions are not more forehanded than the herbs and shrubs and trees of the woodlands. Practically every flower and leaf that will gladden our eyes next April and May is already in place, and only awaits the signal that will be given by the returning sun and the warm spring rains.

Preparation for next spring's flowers, as a matter of fact, began immediately after last spring's flowers had faded, and in most plants went on even while fruits and seeds were ripening. The leaves of plants like dog-tooth violet and trillium, that stood all summer long with no flowers to grace them, were busy all the time making food and sending it down into underground bulbs, corms and rhizomes. In the meantime, buried growth-points were forming up into the beginnings of buds, enfolding the embryonic structures of another crop of

Ready for Spring

flowers. When the new growing season comes on, the food reserves will be liquidated and poured into the task of speeding the unfolding of the new flowers.

Something of the same sort goes on all over the branches of woody plants that blossom early in spring, like dogwood and redbud, and the lilacs and forsythias of our gardens. In the axils of this year's leaves, or at the twig-tips, the buds of next year's growth form during the summer. Already in them are the beginnings of next spring's bloom.

Only by provisions like this can we have spring flowers at all. Flowers are expensive things: they need a great deal of food for their structure, and more for the energy expended in the rapid process of blossoming. Most plants have to make their own food, which is the job of mature leaves. If flowers come before the leaves, or while the leaves are young and small, the food will have to be stored ahead of time.

The whole process of forcing flowers, so that we have a foretaste of spring even in winter, is based on this fact. We bring bulbs or cut branches indoors, giving them as nearly spring-like conditions of temperature, moisture and light as we can provide. These stimuli cause the unlocking of the natural food cupboards, and release the chain of events that ends in the early unfolding of the flowers.

Science News Letter, November 13, 1948